RM
859
R313
v. 16
no. 5
c. 1
GERSTS

RADIUM

EDITED BY
CHARLES H. VIOL, Ph. D.
AND
WILLIAM H. CAMERON, M. D.

VOL. XVI FEBRUARY, 1921 No. 5

CONTENTS

The Leonard Prize for Research.....65
A Correspondence Course in the Physics of Radio-Activity 66

REVIEWS AND ABSTRACTS

Walter S. Franklin, M.D., F.A.C.S. and Frederick C. Cordes, M.D. Radium for Cataract 67
H. H. Bowing, M.D. Topical Applications of Radium.. 71
Douglass W. Montgomery, M.D. and George D. Culver, M.D. Treatment of Vascular Naevi with Radium.. 72
John B. Deaver, M.D. Hysterectomy at the Lankenau (formerly the German) Hospital 75
Albert Soiland, M.D. Radium Element versus Radium Emanation 78
Obituary—Henry H. Janeway, M.D..... 80

A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY PHYSICS AND THERAPEUTICS OF RADIUM AND RADIO-ACTIVE SUBSTANCES

ACADEMY OF MEDICINE TORONTO 13 QUEEN ST.
LIBRARY NOV 13 2001 UNIVERSITY OF TORONTO

RADIUM

A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY, PHYSICS AND THERAPEUTICS OF RADIUM AND RADIO-ACTIVE SUBSTANCES

Edited and Published by Charles H. Viol, Ph. D., and William H. Cameron, M. D. with the assistance of collaborators working in the fields of Radiochemistry, Radioactivity and Radiumtherapy.

Subscription $2.50 per year, or 25 cents per copy in the United States and Canada in all other countries $3.75 per year.

Address all communications to the Editors, Forbes and Meyran Avenues, Pittsburgh, Pa.

VOL. XVI FEBRUARY, 1921 No. 5

THE LEONARD PRIZE FOR RESEARCH

The following announcement appeared in the current issue of the American Journal of Roentgenology.

"The American Roentgen Ray Society will award $1,000 to the author of the best piece of original research in the field of x-ray, radium or radio-activity. The competition is open to any one living in the United States or its possessions, in Canada, Mexico, Central or South America, Cuba or other islands of the Western Hemisphere. The research matter must be submitted in literary form in the English language not later than July 1st, 1921, and must never have been published. Each paper must be signed by motto and accompanied by a sealed envelope containing motto and name, so that the identity of the author may be disclosed after the award has been made. In case a demonstration of an invention or method is necessary, the identity of the author may have to be known before the award is decided."

"The field of research includes discovery, invention, improvement of method, or investigations to prove or disprove any theory or problem, whether old or new, which has a direct bearing upon the use of x-rays, radium or other radio-active substances."

"This competition is not open to any research involving a patent or copyright, and the submission of any research work for this prize carries with it the understanding that the subject matter will remain open to free use for the general good."

"The committee reserves the right to withhold the award if in its judgment no piece of research offered possesses sufficient merit. It also reserves the right to divide the award if two papers are judged to be of equal merit. A certificate of honorable mention will be given to the author of meritorious research which has been submitted but which has not received the prize."

"Papers, records or material are received in this competition only with the understanding and agreement that any work receiving award or honorable mention may be published in The American Journal of Roentgenology at the discretion of the research committee. All expenses of publication will be borne by the Journal. Papers not published will be returned to the authors."

"The piece of original research receiving award must be presented before The American Roentgen Ray Society at its next Annual Meeting, September, 1921."

"This prize is offered in an altruistic spirit for the promotion of useful research, with the approval of the National Research Council. It commemorates the name of a martyred member of the American Roentgen Ray Society, Dr. Charles Lester Leonard, who paid the supreme penalty for his pioneer research in the field of x-ray."

Committee—A. W. Crane, M.D., chairman, 420 South Rose street, Kalamazoo, Michigan; P. M. Hickey, M.D., 32 Adams avenue, W|(Detroit, Michigan; Henry K. Pancoast, M.D., University Hospital, Philadelphia, Pa. Communications may be opened with any member of the committee.

A CORRESPONDENCE COURSE IN THE PHYSICS OF RADIO-ACTIVITY

A correspondence course in the Physics of Radio-Activity, prepared especially for Biologists, Physicists and Surgeons, is offered by N. Ernest Dorsey, Ph. D. (J.H.U.) consulting physicist and consultant to the National Bureau of Standards, who announces the opening of an office and laboratory at 1519 Connecticut Avenue, Suite 4, Washington, D. C.

Dr. Dorsey was until recently Chief of the Radium and X-Ray sections of the United States Bureau of Standards and he now offers his services to biologists, physicists and surgeons, authors, inventors and manufacturers to assist in the solving of such of their problems as require the knowledge of physics or a familiarity with the experimental technic of that science. Dr. Dorsey has prepared a course on the Physics of Radium and Radio-activity which will be presented by correspondence. The object of this course is to give a readable presentation of the physics of radio-activity, with special reference to the needs of the surgeon or of the biologist who employs radio-active materials. To this end the presentation is as unmathematical as possible; digressions, as need be, are made to recall closely allied phenomena that, probably in many cases, have become only hazy recollections, but of which a knowledge is needed for a proper appreciation of the main subject; tables and charts are freely used. A few of the topics presented are the following: Discovery of radium; disintegration hypothesis; accumulation and decay; families of elements; atoms of matter and of electricity; radiation; radiation and matter; radio-active radiations; energy emitted; radium; radium emanation; active deposit of radium; mesothorium; units and standards; measurements; practical applications.

The Editors of this Journal take pleasure in recommending to its readers this proposed course of Dr. Dorsey and suggest that further particulars be secured from Dr. Dorsey by writing to him at the above mentioned address.

REVIEWS AND ABSTRACTS

Walter S. Franklin, M.D., F.A.C.S. and Frederick C. Cordes, M.D. (San Francisco. Radium for Cataract. American Journal of Ophthalmology, Ser. 3, vol. iii, 643-647, Sept. 1920.

"The influence of radium on lens opacities as studied in the Department of Ophthalmology in the University of California is reported in this paper, with an account of work previously reported in this direction by other observers. The results obtained are stated in tabular form. The paper was read before the California State Medical Society and is published here through the courtesy of the Society and its Journal."

Various procedures have been attempted and a great deal of time and effort expended in an attempt to either absorb or check the progress of lenticular opacities. Numerous chemical reagents have been experimented with, but the results were discouraging and the treatment too severe and painful without sufficient improvement to warrant their continuance."

"Cohen and Levin, of New York, in the early part of 1918 applied radium therapy systematically to cataracts. They reported an improvement in 87% of their cases. Following their presessional report, in April, 1919, we began radium therapy especially in cataracts, and this brochure expresses our tabulated results."

"The gamma rays are the more penetrating and concern us in therapy, while the alpha and beta should be excluded, although it is probable that all three have a therapeutic effect, which consists in tissue destruction."

"Cohen and Levin in 1919 described their technic as follows: The radium was covered with brass, photographic paper and gauze and placed over the lid. The distance between the radium substance and the eyelid was about 2 cm. They used 2—3 mm. of brass screening and 2 cm. of gauze. The exposures lasted from one to two hours and were repeated twice a week during the first five weeks and then once a week."

"The purpose of this paper is to describe the technic and give our rsults in thirty-one cases. Our method of application differs from the published description and has been the result of gradual development and the dosage somewhat arbitrary."

"In the use of screens and distance, we have been guided by the experiences of the Department of Dermatology of the University of California."

"We are using 9.95 mg. of radium element in the form of radium barium sulphate in a circular gold plated glazed plaque over an area of 50.26 sq. mm. The apparatus consists of a specially designed silver cup to facilitate handling the radium. The bottom of this cup is made of a piece of silver 0.5 mm. in thickness and screens out practically all but the gamma rays. The cup is embedded in a block of vulcanite, the bottom of which is 0.6 cm. from the silver cup. The vulcanite is used as an easy method of obtaining a certain fixed distance and thus has the advantage over gauze pads. The container is now applied on a lead plate 1 mm. in thickness. This plate is shaped to cover the eyebrows and lashes and extends over the cheek a short distance. Directly under the radium is a hole 8 mm. in diameter (the diameter of the radium plaque). The lead plate acts as an additional safeguard against alopecia of the eyebrows and lashes and gives a convenient method of applying

the radium. There is some doubt as to the harm done by secondary rays, which in this apparatus would be given off by the lead plate, and to prevent the possibility of injury from these rays, a piece of rubber dam is placed, as an additional safeguard, below the lead plate."

"The patient is placed in the prone position and the lids of the eye under treatment held closed by applying a small strip of surgeons' isinglass plaster. A small gauze sponge is placed on the eye to prevent the apparatus from coming in direct contact with the patient. Over this gauze sponge the radium apparatus is placed and held in position by two tapes and two small pieces of adhesive plaster. The patient is told to fix the ceiling with the uncovered eye, thus bringing the lens of the eye under treatment more directly under the radium. In this method, the radium is about 1.2 cm. from the eye."

"The matter of dosage is rather an uncertain one, varying with each type of radium applicator. A milligram hour is the exposure to one milligram of radium for one hour. The term gives a method of dosage for a given plaque of radium if the conditions of screening and distance are included. In most of our cases, we have been giving 10 milligram hours twice a week for four weeks and then once weekly until the process is stationary. Following this, one exposure is given monthly. Experimentally it has been shown that the normal tissues of the eye are more resistant to the radium than the tissues of the skin, therefore, the lid gives a valuable indication against an overdosage, as a reaction would take place here before any injury could be done to the structures of the globe. In one of the earlier cases there was a mild reaction when less screening was used. The erythema of the lid passed away within a few days. No other reactions have been observed.'

"A radium emanation plant has been installed at the University Hospital and we are now using radium emanation in the treatment of a series of cases. The tubes are screened with silver so that the silver cup is omitted in the application; with this exception the method remains the same. The length of exposure varies according to the strength of the tube. The dosage given is equivalent to 10 milligram hours. For example, if a tube checks up as equivalent to 20 milligram gamma radiation, the time of exposure would be for half an hour. It is too early as yet to give the results with this method.'

"Before starting the radium therapy, the vision and ophthalmoscopic findings were carefully noted. Every month an examination was again made and the above recorded. When the vision remained stationary for one month, an application of 10 milligram hours every four weeks was found to hold the improvement. The chart shows graphically the results obtained while but a few of the cases will be described in detail."

"Case No. 1. F. S., Female, age 58. Complains that distance vision has gradually been failing. Change of glasses no help. External strabismus L. since fire, 1906. R. V. 0.2, L. V. 0.1 blurred. *Examination*: Incipient cataracts in both eyes. Fundi negative. Patient was given 190 milligram hours of radium at weekly intervals for a period of 6 months. At the end of that time vision was R. C. 0.6 vision. Vision has gone from 0.2 to 0.6."

"Case No 11. N. L., Female, age 32. Examination showed perinuclear cataracts in both eyes. Fundi negative. R. V. 0.5; L. V. 0.5. Patient was given 60 milligram hours to each eye from Feb. 18, 1920, to March 25, 1920. At the end of that time R. V. was 0.8; L. V. 1.0. Vision has gone from 0.5 to 0.8 in R. and from 0.5 to 1.0 in L."

"Case No. III. A. S., Male, age 58. Gradual failing of vision in both eyes, most marked in R., for last two years. Examination showed an immature cataract in R. and an incipient cataract of the cortical type in the left eye. Fundus negative.

Table of Cases

Class	NAME	Age	Amt. Radium Mil-hrs.	Dates		Vision		Remarks
						Before	After	
P.	Mrs. L. L.	58	R. 80	11-6-19	4-5-20	.3	.6	Improved
			L. 40	1-4-19	4-5-20	.5	.8	
P.	Mrs. A. B.	50	R. 50	3-1-20	4-12-20	wgl .1 chart	wgl. .1	
			L. 50	3-1-20	4-12-20	wgl .4	wgl. .6	Improved
P.	Mr. J. B.	66	R. 90	1-15-20	4-1-20	.3	.5	Improved
P.	A. H. B.	74	L. 80	3-10-20	4-8-20	.2	.4	Improved
P.	Mrs. M. G.	80	R. 80	2-11-20	4-7-20	.1	.2	Improved
P.	Mrs. F. D.	56	R. 70	7-17-19	12-18-19	.3	.6	Improved
			L. 80	7-17-19	12-18-19	.4	.6	
P.	Mrs. B.	50	L. 50	11-7-19	12-11	.8	1.1?	Improved
P.	Miss M. B.	81	R. 40	7-10-19	9-18-19	fingers at 10 ft.	.2?	Improved
P.	Mrs. A. L.	53	R. 100	7-24-19	1-22-19	1.0?	1.1	Improved
			L. 100	7-24-19	1-22-20	1.0?	1.1	
P.	Mrs. N. H.	50	R. 50	7-12-19	11-26-19	1.0	1.1	Improved
			L. 90	7-12-19	11-26-19	1.0	1.1	
P.	Dr. M. G.	53	R. 90	8-1-19	3-3-20	.5	.5	Not Improved
			L. 90	8-1-19	3-3-20	.5	.5	
P.	Mrs. D.	60	R. 40	1-14-20	3-11-20	.4	.5	Improved
			L. 40	1-14-20	3-11-20	.4	.5	
P.	Mrs. M. P.	64	R. 65	7-12	11-13	wgl .5	wgl .8	Improved
P.	Mrs. N. L.	32	R. 60	2-18-20	3-25-20	wgl .5	wgl .8	Improved
			L. 60	2-18-20	3-25-20	wgl .5	wgl 1.0?	
P.	J. P. L.	53	L. 80	1-30-20	3-18	wgl 1. ?	wgl 1.	Slight Improvement
P.	Mrs. B. V.	87	R. 20	10-9-19	10-30-19	02	Same	No Improvement
			L. 20	10-9-19	10-30-19	fingers 6 ft.		
P.	Mrs. F. T.	70	L. 80	7-11-19	3-24-20	wgl .1?	wgl .2-1	Improved
P.	Mr. P. A.	63	R. 120	2-2-20	4-13-20	.1?	.2?	Improved
P.	Mr. G. K.	60	R. 50	2-18-20	3-27-20	wgl .3?	wgl .3	Slight Improvement
			L. 50	2-18-20	3-27-20	wgl .5?	wgl .5	
P.	Mrs. F. S.	58	R. 190	10-16-19	4-12-20	wgl .2	wgl .6	Improved
P.	Mr. F. C. F.	23	R. 30	10-23-19	12-11-19	.6	.8	Improved
			L. 30	10-23-19	12-11-19	.6	.8	
C.	Mr. A. A.	63	R. 50	1-26-20	3-9-20	.3	.4	Improved
C.	Mrs. F. C.	62	R. 65	11-10-19	2-17-20	fingers 10 ft.	fingers 16 ft.	Slight Improvement
C.	Mr. K. C.	56	L. 45	2-12-20	3-19-20	.5-2	.5-1	Slight Improvement
C.	Mrs. E. G.	30	R. 110	8-29-19	3-12-20	.2	.5-2	Improved
			L. 110	8-29-19	3-12-20	.1	.1	Not Improved
C.	Mrs. M. H.	65	L. 45	1-30-20	3-8-20	.5-1	.5-2	Slight Decrease
C.	Mr. G. J.	64	L. 55	1-2-20	3-11-20	.6-2	.6-1	Slightly Improved
C.	Mr. C. R.	51	R. 30	1-20-20	3-15-20	.2	.2	No Improvement
C.	Mr. A. S.	58	L. 200	8-19-19	3-11-20	.5	1.2-3	Improved
C.	Mrs. B. A.	55	R. 25	1-28-20	3-10-20	.1	.2	Slightly Improved
			L. 25	1-28-20	3-10-20	.1?	.2?	
C.	Mr. T. H.	64	L. 30	8-21-19	8-28-19	.2	.1	Worse

P—Private.
C—Clinic.

The patient was given 200 milligram hours of radium to left eye at weekly intervals over a period of 6 months beginning August 8, 1919.

Aug. 8, 1919, L. V. 0.5.

Oct. 19, 1919, L. V. 1.0.

Dec. 11, 1919, L. V. 1.2—4.

Reported back April, 1920, R. V. 1.2—3.

During this time R. V. became worse, going from 0.1 to fingers at 4 feet. No radium had been applied to right eye.

The vision of the left eye improved from 0.5 to 1.2—3."

"CASE NO. IV. N. H., Female, age 50. Early incipient cataracts of nuclear type discovered during routine examination. Fundi negative. R. V. w. gl. 1.0; L. V. w. gl. 1.0.

Patient was given 50 milligram hours to R. and 90 milligram hours to L. From July 12, 1919, to Nov. 26, 1919, R. V. 1.2 at that time, L. V. 1.2. This case shows that very early cataracts will disappear entirely. To date (5 months later) there is no evidence of recurrence."

"CASE NO. V. M. P., Female, age 64. Gradual failing of vision for past two years. Glasses no help. Examination: R. incipient cataract of the cortical type. Fundus negative. L immature cataract.

R. V. w. gl. 0.5. Patient was given 65 milligram hours from July 12, 1919, to Nov. 13, 1919. R. V. at that time 0.8, showing an increase of 0.3. The opacities have thinned out a good deal."

"Of the thirty-one patients under observation, 84.3% showed a change for the better, ranging from an improvement of 3—4 letters on the test chart to a complete disappearance of the process. In the cases that showed a marked improvement, the opacities were very definitely thinned out; one of these, a very early nuclear cataract, disappeared entirely leaving no trace of the opacities. In no instance where there has been an improvement has there been any retrogression to date, however, the time of observation has been too short to determine whether or not the cataract will eventually go on to maturity."

"Twenty-one of the cases treated were private, the remaining ten being clinic patients. The percentage of improvements was much higher in the private cases. This is explained by the fact that due to the difficulty of obtaining the radium for the Out-Patient Department, these individuals did not receive the exposures systematically in many instances. This emphasizes the necessity of frequent systematic treatments in the beginning."

"Radium is of proven value in the treatment of incipient cataracts. Our findings correspond sufficiently well with those of Levin and Cohen to indicate that it is not merely a coincidence but that actual results are obtained. Although the vision cannot be brought up to normal in many individuals, the ultimate outcome is superior to an aphakic eye such as is obtained by surgery and does not subject the patient to the surgical risk of such a procedure.

"CONCLUSIONS. 1. The application of radium does no injury to the normal structures of the eye.

2. It apparently has a selective action upon the lens.
3. Radium improved the vision in 84.3% of our cases.
4. A consistent technic and known dosage seems advisable.
5. Frequent treatments are necessary in the beginning."

* * * * *

H. H. Bowing, M.D. (Rochester, Minn.). Topical Applications of Radium. Am. Jour. Roent. vii, 582-583, Dec., 1920.

"In our application of radium in the Mayo Clinic we use the terms milligram hour, erythema dose, distance screening, and so forth."

"Milligram hours must be defined in each case. The amount of radium used multiplied by the hours applied gives the number of milligram hours. Applying 50 mg. of radium for twenty hours is not the same as applying 20 mg. for fifty hours, although the total of milligram hours is the same."

"The term erythema dose represents 1,000 mg. hours of radium, delivered to a square inch of skin surface at one inch distance, filtered through the silver wall of the applicator and 2 mm. of lead. The universal round applicator containing 50 mg. of radium screened with 0.5 mm. of silver and 2 mm. of lead at one inch distance applied for twenty hours is considered an erythema dose. In the majority of cases no erythema developes. The erythema which occurs occasionally is transient. It usually responds readily to simple treatments."

"The term 'distance screening' indicates that some substance, such as cork, wood or gauze, has been interposed between the radium and the skin surface overlying the area to be radiated. The distance bears a relationship to the amount of radium used and the distance of the lesion beneath the surface of the skin."

"Cancer of the breast, primary and secondry sarcoma, Hodgkin's disease, tuberculous adenitis, and splenomyelogenous and lymphatic leukemias respond to topical applications of radium and deep x-ray therapy."

"*Cancer of the Breast.*—In treating a primary carcinoma of the breast with or without metastasis a thorough radiation is indicated before operation and radiation after operation as soon as convalescence permits. Patients in this group have received repeated radium and x-ray treatments when a general anesthetic was contra-indicated owing to some myocardial change, thoracic or renal complication. Our cases in this group are too few for statistical study, but the primary results are encouraging."

"All patients with recurring carcinoma of the breast with or without metastasis improve under this treatment, at least ulceration and sloughing are prevented. Roentgenograms of the chest are taken before treatment in order to determine the depth of the metastasis."

"An erythema dose is delivered to each square inch of skin surface overlying the primary or secondary growth. Should the area be less than one inch square, 500 to 900 mg. hours are given. The treatment is repeated every six weeks until no evidence of activity is demonstrable."

"X-ray treatment is repeated every three weeks until eight or ten have been given; after a wait of three months it is determined whether further therapy is needed. In possible metastatic areas x-ray therapy is given."

"*Sarcoma.*—The round-cell sarcoma responds very readily and the melanotic sarcoma very poorly to radium and x-ray therapy. The spindle-cell and giant-cell sarcomas respond more favorably than the melanotic type. In a majority of cases it is possible to treat only the secondary growth."

"The involved areas are mapped out and an erythema dose of radium is applied to each square inch of skin surface. If the involvement is confined either to the chest cavity or to the abdominal cavity, radium is applied to the anterior surface of each and deep x-ray therapy is given

through the posterior and lateral abdominal and thoracic walls by the cross-fire method. The combined treatment is repeated at intervals of three months if necessary."

"*Hodgkin's Disease.*—The treatment of the acute and chronic cases of Hodgkin's disease is identical. The first type is less amenable to treatment on account of its rapid clinical course. The majority of the patients are treated for cervical, supraclavicular, axillary and inguinal glandular involvement with or without splenic enlargement. Roentgenograms are taken of the chest, abdomen and pelvis to ascertain the amount of involvement of the deep lymphatics."

"Superficial lymphatic enlargements are mapped out and an erythema dose of radium delivered to each square inch of surface. If the nodules are discrete and small, 500 to 900 mg. hours of radium with distance screening are applied to the enlarged node. If there is splenic enlargement, six areas are mapped out over the splenic area and 50 mg. of radium in a univrsal round applicator screened with 2 mm. of lead at one inch distance are applied for periods of four hours each. If the roentgenogram shows involvement of the thoracic, abdominal, and pelvic lymphatics, deep x-ray therapy is applied in the respective areas."

"*Tuberculous Adenitis.*—The simple type of tuberculous adenitis offers the best result. If suppuration is present, curetting or drainage may be necessary. The patient is supported with general hygienic and dietary measures. Hyaline or calcarious adenitis may be an end result following radiation."

"An erythema dose of radium is applied to each square inch of surface covering the enlarged lymph nodes. Should the nodes be discrete and enlarged, 500 to 900 mg. hours of radium are applied. The dose is determined by the size of the nodes. The treatments are repeated every six weeks until all signs of activity have disappeared."

"*Leukemia.*—More radium is given in cases of acute splenomyelogenous leukemia than in the chronic cases in order to put the patient in the chronic state as rapidly as possible. Satisfactory remissions are obtained in practically all cases."

"The amount of radium used is 100 mg. in the acute cases and 50 mg. in the chronic cases. The radium is placed in a universal round applicator walled with 0.5 mm. of silver, with 2 mm. of lead as a filter at one inch distance. Six to eight areas are mapped out over the area of lymphatic or splenic enlargement. The time of each application is four and three hours, respectively. The treatment is repeated at weekly intervals until a series of three or four have been given. During the treatments the blood is examined. If the hemoglobin and red cells decrease, the treatment is discontinued and a six weeks rest is given. All patients are supported medicinally. Dietary measures and daily activities are also controlled."

* * * * *

Douglass W. Montgomery, M.D. and George D. Culver, M.D. (San Francisco). Treatment of Vascular Naevi with Radium. Boston Med. and Surg. Jour. clxxxiii, 412-414, Sept. 30, 1920.

"It was early discovered in the use of radium that it exerted an especially beneficial influence on certain types of naevi. This influence is most marked on the large, tuberous, vascular ones, in which the

growth, if it is progressive, is not alone stopped, but the tumor also shrinks in size, and the startling red color disappears."

"As in the use of a powerful agent like radium, the technique is of the first importance and as the greatest help we ourselves got during our novitiate was from the admirable reports issued by Pinch of the Radium Institute of London, we, in the hope of being similarly helpful to our colleagues, shall give our procedures."

"On March 21, 1918, a baby girl of ten months was referred to us for a large, cavernous naevus 1.50 cm. in diameter and .50 cm. high, situated on the inner surface of the left upper arm. At birth it was a small red spot and had grown steadily ever since, and with especial acceleration within the past two months, so that either operation or control was felt to be imperative. Its surface was covered with vascular stellate red patches, and its substance felt like a loose bag."

"We applieh seventy-five mgms. of radium on the tumor for three and one-half hours, which not alone stopped the growth of the tumor, but secured a decided retraction."

"After five treatments, scattered through a period of eighteen months, the mother, in a letter recently received, says that the arm is almost like the other, except for a few superficial dilated capillaries."

"A female infant, ten months of age, was brought to us February 12, 1919, with a very large naevus of the left cheek. There were no symptoms when she was born. When two weeks old, the lesion was the size of a mosquito bite, and had steadily grown till when we saw it, at ten months of age, it was a raised, deep red, cushion-like naevus with a rolled border and a sunken center. It measured three cm. in diameter and seven mm. in height, and caused the cheek to project out like a truncated cone. The center was, as before mentioned, sunken, and was cicatricial, the result of ulceration which had begun three months before, and had healed about four days before we saw the child. These spontaneous ulcerations occasionally occur on these very exuberant naevi and may cause alarming hemorrhages. When ulcerated, they may be readily mistaken for malignant disease. As a matter of fact, vascular naevi rarely become mlignant; we hve never seen one do so."

"There was no evidence of naevus formation in the mucous membrane of the cheek within the month."

"We applied a strong plaque of radium, 24.23 mgms., over the center, screened with lead 1.50 mm., wood 2.00 mm., and one thickness of adhesive plaster, and on each side a 25 mgm. tube enclosed in its silver and brass tubes and screened besides with 11 mm. of lead, 2 mm. of wood, and one thickness of adhesive plaster. This was retained in place for five hours."

"On March 27, a similar treatment was given, but with a less thickness of lead (0.40)."

"On May 27, 1919, the tumor was so reduced that only one radium tube could be used over it. This tube contained 25 mgms. of radium element and was enclosed in its silver capsule. Besides it was screened with lead 1.00 mm., wood 2 mm., and was retained in position for five hours."

"On November 5, 1919, a similar radiation was given and the tumor was so reduced in size that we think that no further radiation will be given for a very long time, if at all."

"A girl baby of eighteen months was referred to us July 9, 1919, for a bulbous, violet naevus occupying the whole nose tip. As above

mentioned, these tuberous ones are particularly amenable to radium treatment, and the parents were told that marked improvement could be expected. From the nature of these cass, however, the skin never can become exactly like normal skin. The hyperplastic naevus blood vessels shrink away but the cutaneous texture never entirely resembles the beautiful, soft texture of the normal skin. The improvement is, however, striking, and by far and away better than under any other treatment."

"A very strong radium plaque was employed and a very thick screen; the plaque was the size of a ten-cent piece and contained 24.23 mgms. of radium element. The screen was composed of 2 mm. of lead, 2 mm. of wood and 12 thicknesses of gauze, and one thickness of zinc oxide adhesive plaster. This was held in place for two and one-half hours."

"On August 27, 1919, she received another treatment with the same plaque, but the lead screen was reduced to 1 mm. The wood and gauze and adhesive plaster, and the time were as in the previous treatment."

"On November 4, 1919, another treatment was given with the same plaque. The screen consisted of brass 1.2 mm., wood 2 mm., gauze four thicknesses, zinc oxide adhesive plaster one thickness, and the time was five hours."

"On February 26, 1920, another treatment was given with the screening and the time as on the previous treatment, November 4, 1919."

"The heavy screening was intended to eliminate the caustic alpha and beta rays, and even some of the softer gamma rays, and therefore, was intended to avoid all burning, in which we were successful."

"Attention is drawn to the fact that three months elapsed between each treatment. This was to allow time for the complete shrinking to take place which each treatment was capable of producing before the next treatment was begun. This we regard as important, and it may be that, in this case, more treatments may be given if it is surmised that there is still naevus tissue present."

"In another case, a baby girl of sixteen months had a walnut sized angioma situated on the left side of the forehead at the ehair line. She got a radiation, at first with 75 mgms. of radium, suitably screened, for two and one-half hours on July 17, 1919. Two months afterwards she got a radiation with 25 mgms. of radium for five hours, and again in three months a similar radiation for an equal space of time. The result is excellent."

"The flat, red naevus, the naevus flammeus, is not nearly so amenable to treatment with radium as the large, tuberous ones; but still, even they, with care and patience, may be much improved."

"With a patient, ten years of age, with such a naevus of the right side of the nose, extending to the inner canthus of the eye, and including the right upper eyelid, the right eyebrow, and extending up on the forehead, and a very small area beneath the right nostril, we employed the electrolytic needle, CO_2 snow, and radium. The best results were later obtained from radium."

"As can be seen by reading the above, the screening is of the greatest importance and must necessarily vary with the type of lesion treated, with the concentration of the radium preparation employed, and with the time this preparation is retained in place. One fundamental principle to bear in mind is that it is far better to err on the side of the screening too much. This precaution is especially necessary when a cosmetic result is wished for, as is so frequently the case in naevus."

"In the first place there is a difference between screening and shielding. The shield is employed to protect the surrounding tissue. If the lesion is small, a hole for it is punched in a piece of thick lead, say I mm. thick. The hole should be a little larger than the lesion. This lead has to have either cellulose (paper, wood or gauze), or rubber between it and the skin to prevent the action of the secondary rays."

"The surrounding tissues having been shielded, the screen is placed on the face of the radium applicator and then applied and firmly plastered down with adhesive plaster."

"A favorite plaque with us is one made according to recommendations from Dr. Robert Abbe of New York. It is the size of a ten-cent piece. In ordering it from the radium firm from which it was purchased it was requested to include in the plaque all the radium possible in this sized glaze. Our plaque contains nearly 25 mgms."

"We screen this with 1 mm. of lead, 2 mm. of wood, 12 thicknesses of gauze and one thickness of the zinc oxide adhesive plaster employed in binding this all together. This may be retained in place for five hours or longer without fear of burning, and the results show that a sufficient radiation goes through this material to act efficiently on the hyperplastic blood vessels of the tumor."

"The Spider Naevus." Usually included among the vascular naevi, but not at all in the same pathological class, is the spider naevus. It consists of a bright red, central point, with dilated capillaries radiating out from it. This is not at all amenable to radium treatment as it does not contain any naevus tissue or hyperplastic naevus blood vessels to be acted upon by the gamma rays."

"The dilated central point and the radiating capillaries are easily obliterated with the electrolytic needle."

* * * * *

John B. Deaver, M.D. (Philadelphia). Hysterectomy at the Lankenau (formerly the German) Hospital. Ann. of Surg. lxxiii, 84-90, Jan. 1921. A report of one year's (1919) work including the writer's experience with radium in uterine conditions during the year, and remarks on the pathology by the director of the pathological laboratories of the hospital. Read before the American Surgical Association, St. Louis May 3, 1920.

"The year's (1919) work in hysterectomy at the Lankenau Hospital of Philadelphia comprises 130 operations, of which 46 were complete and 84 subtotal. Two deaths in the entire series yields a mortality of 1.5 per cent."

"A complete hysterectomy was done for simple uncomplicated fibroids in 7 instances and in 14 for fibroids with one or more complications. In addition to these there were 10 cases of prolapsus uteri, with acute or chronic inflammation of the cervix, tubes and ovaries, necessitating a complete hysterectomy. The series also included 5 cases of carcinoma of the uterus, one of which presented extensive ulceration, gangrene and purulent infiltration at the site of radium treatment, by no means an isolated instance of this kind that has come to my notice. The one death among the complete hysterectomies was due to myocarditis."

"Subtotal hysterectomy for fibroid was done in 84 cases, 12 being simple non-complicated and 72 complicated—the complications being

salpingitis, tubo-overian inflammation, pyosalpinx, anomalously located fibroids, pregnancy, nephritis, endocarditis, etc."

"In this series of 84 cases there was not a fatality. Malignancy was present in 2 instances, in 1 associated with carcinoma of the breast. Sarcoma was noted in 1 case. In 7 instances degeneration of the myoma had occurred, hyaline 6 times and calcareous once. Adenomatous polypi of the uterus, cervix or both were present 5 times."

"The fatal case in this series was due to enterovaginal fistula, the result of radium treatment."

"Total hysterectomy for fibroid or fibroids should be the better operation, particularly when the patient is near, at, or past the menstrual epoch, and especially when there is any doubt about the condition of the cervix or the endometrium. Were this the usual practice there would be less likelihood of subsequent carcinoma and a recurrence of the fibroid of the cervix, which I have seen, necessitating a difficult operation for its removal."

"*Radium in Uterine Surgery.*—During the same year (1919) 58 cases were treated with radium, 39 for carcinoma of the cervix, 12 for carcinoma of the uterus, 5 for myoma uteri, and 2 for chronic endometritis. One death makes the mortality figures about the same as in the operated series. While, of course, figures standing alone are not convincing, I believe they speak favorably for surgery in this instance. I emphasize this the more especially as I am so often confronted with the destructive action of radium, such as gangrene, ulceration and purulent infiltration in the site of the application, that I must necessarily hesitate to sound its unqualified praises."

"With the introduction of any new therapeutic agent there very naturally arises the hope that the solution of a perplexing problem is at hand. Radiation in the treatment of disease of the cervix and uterus has proved no exception to this rule. More or less enthusiastically, usually more, during the past several years the roentgenologist and radium therapists have been so loud in their praise of their results that the protesting or opposing voices have been in danger of being drowned. It is not, however, as a total opponent to radiation in the treatment of these diseases that I ask to be heard at this time, but rather for the purpose of introducing a different note, perhaps in a lower key, into the melody."

"First and foremost I believe that in the decision for or against the use of radium the voice of the surgeon should be accorded equal if not greater weight than that of the radiologist. Every fair-minded surgeon is free and indeed glad to acknowledge that radium can control uterine bleeding, in fact arrest it; and that together with the x-ray the size of intramural and submucous fibroids can be reduced if not entirely dissipated. But there remains to be considered the effect of the presence of mutilated and destroyed tissues. Is not a woman better off without a uterus or with only the neck of one than she who harbors an organ that has been burned to death? Is not this a rather undesirable tenant of the human body? Better an empty house than an undesirable tenant. Moreover, radium treatment for fibroids has in four instances that have been recently brought to my attention been the direct cause of death, the fatal outcome being due to peritonitis in one case, rectovaginal fistula in another and extensive pelvic suppuration in the remaining two."

"It is my practice to make a transperitoneal complete removal of the uterus in all cases of carcinoma of the fundus and in very early carcinoma of the cervix. I am sure this is the better practice than is the

use of radium in this early stage. Recalling the free lymphatic supply of the cervix and that the lymphatics pass through the broad ligaments, is not this a better surgical procedure than to apply radium? Radium should, in my judgment, be used only in the late cases, those in which lymphatic involvement has gone beyond the reach of the knife. In the latter class of cases, radium properly used without doubt prolongs life, but that it cures, I doubt. I have never seen a case of advanced cancer of the cervix, where the entire cervix has been involved, cured by radium. I have, under the latter circumstances, seen the cervix under the administration of radium practically returned to apparently normal conditions, but, sad to say followed by recurrence in a comparatively short time, which recurrence in my experience is seldom benefited by the further use of radium."

"Even in the non-malignant uterus with free hemorrhage, where in the absence of adnexal complications radium has a recognized field, the cases should be judiciously selected. Menorrhagia in a young woman is a serious matter and requires careful study. Very often hysterotomy is the better method for arriving at a correct diagnosis and determining existing pathology, and is indicated rather than curetting through the vagina or the application of radium. Too often, I fear, the specialist may yield to the persuasion of his clients and administer radium to relieve the inconvenience of menstruation prolonged a day or two beyond the usual time, unmindful or perhaps ignorant of the fact that the indiscreet use of radium in a young woman suffering from menorrhagia or metrorrhagia is liable to lead to sterility. It is against such illegitimate use of the substance that I would register a most serious protest."

"While in some cases of chronic endometrial inflammation radium has proved useful, I believe here also it should be used only after all other recognized means of treatment have failed."

"Very often the differentiation of quiescent appendicular inflammation and latent non-palpable tubal disease can be made only by opening the abdomen and inspection; therefore, in the presence of this uncertainty as to the propriety of using radium the knife is the better arbiter in the matter."

"In a number of cases of purulent leucorrhœa, radium has failed to be of value, and while curetting, cauterization of the endometrium or the application of iodine, etc., may be efficacious, there is little chance of these measures proving so on account of the probable involvement of the tissues adjacent to the endometrium, so that removal of the uterus either by the transperitoneal or the vaginal route offers the only hope of cure."

"Of the action of radium on tissues two striking changes have come to notice and on which all authors agree. They are an increase of connective tissue and a decrease of parenchyma. The most complete studies have, of course, been made of its effects on carcinoma. The connective-tissue overgrowth presents the most striking picture, but recent investigations by Alter, for example, show that the destruction of parenchymatous cells is the most important. The chromatin substance of the nuclei displays a great sensitivity toward the rays of radium and undergoes a deep-seated chemical change. The final result is a destruction of the nucleus and a scattering of the chromatin. The connective-tissue increase seems secondary, its purpose to replace the destroyed parenchyma. There is, apparently, no stimulation of this tissue to active growth by radium."

"Two specimens have been especially studied in this laboratory at periods varying from one week to five weeks after radiation. The organs were removed surgically. The first specimen was that of a squamous-cell carcinoma of the cervix. Great destruction of carcinoma cells was evident, with intense congestion and polymorphonuclear and other cell infiltration. The destructive effect was manifest through the length of the cervical canal and extending into the wall approximately one-half inch. Beyond this living carcinoma cells were plentiful. The other patient presented a continuous small amount of hemorrhage and was suspected of having carcinoma of the fundus. The uterus was very soft and boggy and the entire uterine cavity showe dan intense inflammatory reaction, with mucosa and considerable muscle immediately about the site of the radium necrotic and deeply ulcerated. The remainder of the uterine mucosa also showed ulceration extending from a part to a whole of this structure. Beyond the necrotic part, and extending throughout the entire wall of the uterus, was an extraordinarily violent inflammatory reaction. Sections from other parts of the uterus showed the same œdema, pus-cell infiltration, hemorrhage and congestion, but to a less degree. Tubes and ovaries also gave evidence of acute inflammatory reaction, but to a still less degree. A small amount of fibrin was present on the peritoneal surfaces. Reparative processes were practically entirely absent. No carcinoma was found."

"There can be no doubt, therefore, of the intense destructive activity of radium. If the dose can be so graduated to destroy endometrium when this is desirable, its field of usefulness is, of course, established. When, however, its destructive properties are not controlled or controllable, its potentialities for harm are limitless."

"Since the endometrium in the cycle of its normal functions undergoes marked anatomic changes, it follows that for intelligent interpretation of anatomic pictures it is essential to consider the data of menstruation with the specimen of pathologic report. The age of the patient and the number of pregnancies and childbirths is also important, for these factors influence the musculature, blood-vessels and interstitial tissues. Especially is this important in the final judgment in cases of so-called myopathic hemorrhage, when all constitutional factors have been ruled out and there remains a uterus with no lesions discoverable by ordinary means."

"Much of the confusion attending these diagnoses and many of the coincident questions, for example, can a hypertrophic endometrium bleed? will then be cleared up. Then the effects of therapeusis, whether by radium or surgry, can be better estimated."

* * * * *

Albert Soiland, M.D. (Los Angeles). Radium Element Versus Radium Emanation. Am. Jour. Roent. vii, 612-614, Dec. 1920.

"This argument will be based upon the writer's personal knowledge of the use of radium element and upon his observation of the radium emanation method in the hands of well known radiologists. It is admittedly difficult to be wholly impartial when one essays a comparison between two methods that are expected to reach the same result, if he is trained to the use of one of these only. Nevertheless, absolute fairness, to the extent of the writer's ability to observe it, will prevail, and it is hoped that a free and frank discussion of the relative merits of the two methods will follow.

"From time to time certain remarks will reach the ear of the radium worker with element, that he is out of date, that only with emanation needles can really scientific work be effected. While such remarks are irrelevant and will perhaps not concern us greatly, yet when our patients inquire of us as to the correctness of such rumors, they take on a more serious aspect, particularly for those among us who are working with limited amounts of radium element. It is to be hoped that no one associated with our scientific societies will permit such insinuations to pass by unchallenged."

"A comparison of the use of element with that of emanation can be made from two angles, the financial and the clinical. It is principally the latter that we shall deal with here. The financial side of the question offers slight ground for debate. One either can, or cannot, afford to invest a sum of money sufficiently large to cover a complete emanation station. If one is more or less limited in his finances and has to bear the burden of expense alone, his investment in radium will more than likely be considerably under one gram of this precious mineral, and this will be in one of the insoluble salts. If money is plentiful, or an endowment available, the result will of course be one gram or more of radium in solution. From a standpoint of gross utility alone, one has no business with so large an amount of radium in any other form than solution. Radium in quantities less than a gram does not lend itself readily for emanation purposes. It is then best applied in the various forms of tubes, needles and plaques, now so conveniently arranged by the manufacturers with accessory appliances for therapeutic use."

"From the clinical side, both radium element and radium emanation have their quota of supporters, some of whom claim specific virtues for their favorite method. It is assumed that all accept as a basic fact the cardinal point that it makes no difference in the final result of every radium treatment, whether element or emanation is used, provided the duration of the period of radio-active units is the same during the exposure."

"There are three distinct advantages with emanation, namely: the ability to make fractional dose units easily; the convenience of imbedding such units into tumor tissue; and the great fact that the parent radium is always safely ensconced in a protected sealed chamber, free from all kinds of molestation. The latter is the main point of advantage; for no matter whether a single emanation needle or any number of these are lost, either in the tissues or elsewhere, the operator knows that no serious results will follow, owing to the limited time of radio-activity possessed by the radium gas. Of importance, also, is the fact that no particular monetary loss has been occasioned. Upon merely a brief analysis the three named points of apparent superiority seem quite insurmountable to the advocate of the element method. A little closer inspection, however, shows that they are not so formidable. True, the fact that one can lose or destroy the emanation needle without feeling the loss of the parent radium, is of itself one great dominating factor that cannot be contradicted in any way. But in regard to the first two points of superiority claimed for the emanation method, the advantage is not so marked, although the use of radium element is, in these respects, somewhat less convenient. In the face of the foregoing admissions, what can the advocate of radium element offer for this method? If he is of the proper caliber, he will probably concede that he is using element largely because he is unable to command an emanation plant."

"However, from the standpoint of applied therapy, there are certain advantages in using the elemental form of radium. In the first place, it is considerably easier to employ. Again, the calculation of an ever changing and depreciating millicurie standard is avoided. Third, the milligram unit of activity in radium element being constant and stable, permits of a simplified and more accurate dosage at all times. The additional fact that one is compelled to watch more closely the implanted element tube or imbedded element needle, calls for even greater care in the supervision of the patients so treated. This point is worthy of reflection."

"What is the minimum amount of radium with which one can attempt comprehensive radium therapy? This question is not easily answered, much depending upon the number of patients treated during the same period. The writer will venture the statement that not less than 100 milligrams can be considered. It has happened that physicians with radium in their possession, in amount not exceeding 25 milligrams, have made known by means of printed announcements sent to the profession that they were prepared to handle referred radium work. Such instances are happily rare, but if encouraged will surely lower standards in a way similar to that done by x-ray operators of a former day, who with inferior apparatus and extremely limited knowledge attempted all sorts of impossible diagnoses and treatments, and thus brought about a state of affairs that even in this day of highly specialized apparatus and modern technique we are yet stigmatized for."

"Radium therapy, whether by element or emanation, has now fully weathered the experimental stage. A number of influential medical men still look upon it with disfavor; but careful and conscientious work, as exemplified by that of our radiological societies, has amply demonstrated the increasing scope of its usefulness. It matters nothing to the patient whether radium element or radium emanation is used in his individual case, provided he gets results; and, in the final analysis, that which does the work is the sum total of the energy radiation."

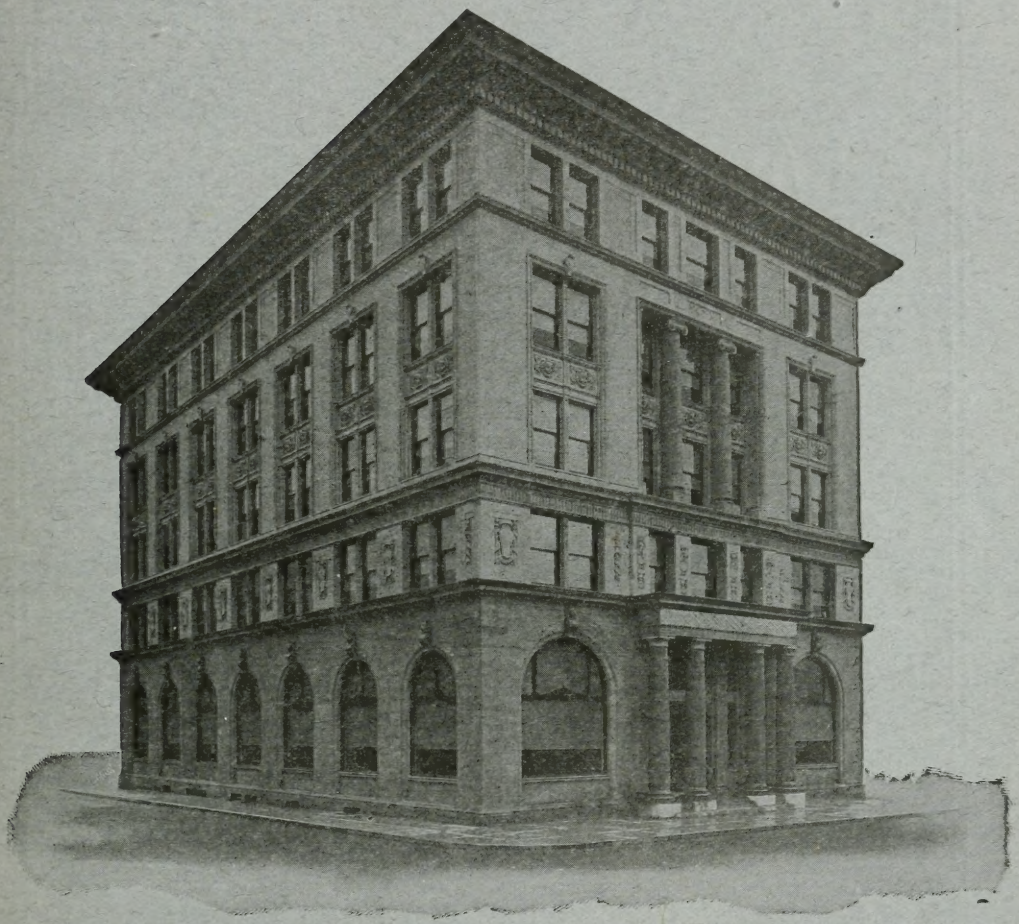
"Therefore, let us continue the study and scientific application of the material we have in hand, confident in the knowledge that radium has done more to assist surgery and the roentgen ray in combating malignancy than any other therapeutic agent known at the present time."

HENRY HARRINGTON JANEWAY, M.D.

Doctor Henry H. Janeway, eminent surgeon and the Director of the Radium Department of the Memorial Hospital in New York City, died at his home on Tuesday, February 1st, 1921. A record of the life and work of Doctor Janeway will be given in an early issue of this Journal.

STANDARD CHEMICAL COMPANY

PITTSBURGH, PA.



General Offices and Radium Research Laboratory, Standard Chemical Company, Pittsburgh, Pa.

Miners of Uranium and Vanadium Ores, and Producers of Radium

STANDARD CHEMICAL COMPANY

RADIUM

STANDARD CHEMICAL CO.

RADIUM APPLICATORS

Standard and Special Designs

Sold with Bureau of Standards Certificate

Departments of Physics and Medicine for instruction in the physics of Radium and the technic of the therapeutic application of Radium and Radium Emanation.

RADIUM CHEMICAL COMPANY

GENERAL OFFICES AND LABORATORIES

Pittsburgh, Pa.

New York	Boston	San Francisco	Chicago
501 Fifth Avenue	Little Building	Flood Building	Marshall Field Annex Bldg.

London

Watson & Sons (Electro-Medical) Ltd., 43 Parker Street, Kingsway, W. C. 2